

Metabolism of HDL

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Introduction

HDL transports
cholesterol from
peripheral tissues to
the liver.

The major apoproteins in HDL are Apo A1, Apo A2, Apo C and Apo E. HDL serves as a plasma reservoir of Apo C and Apo E which can be transferred to VLDL

and chylomicrons
and back.

Metabolism of HDL

The intestinal cells
synthesize

components of HDL
and release into
blood.

The nascent HDL in plasma are discoid in shape.

The free cholesterol derived from peripheral tissues cells are taken up by the HDL.

The apo A1 of HDL activates LCAT

present in the
plasma.

The LCAT then binds
to the HDL disc.

Lecithin is a
component of
phospholipid bilayer
of the HDL disc.

The second carbon
of lecithin contains

one molecule of
PUFA.

It is transferred to
the third hydroxyl
group of cholesterol
to form cholesterol
ester.

The cholesterol from the cell is transferred to HDL by a cholesterol efflux regulatory protein which is an ABC protein.

The esterified cholesterol which is more hydrophobic,

moves into the interior of the HDL disc.

This reaction continues, till HDL becomes spherical with lot of cholesterol esters are formed.

This HDL particle designated as HDL 3. Mature HDL spheres are taken up by liver cells by apo A1 mediated receptor mechanism.

HDL is taken up by
hepatic scavenger
receptor B1.

Hepatic lipase
hydrolyze HDL
phospholipid and
TAG, and cholesterol
esters are released
into liver cells.

The cholesterol that reaches the liver is used for synthesis of bile acid or excreted as such in bile.

When HDL remains in circulation, the cholesterol esters from HDL is transferred to VLDL,

IDL and LDL by a
Cholesterol Ester
Transfer Protein
(CETP).

This will help to
relieve product
inhibition of LCAT so
that more

cholesterol can be taken up.

TAG from VLDL, IDL, LDL is transferred to HDL in exchange for the cholesterol ester.

The HDL particles that are rich in TG and spherical are called HDL 2.

These particles are first acted upon by hepatic triglyceride lipase (HTGL) before being taken up by scavenger B1 receptor in liver.

Clinical significance of HDL

Thank you